

Silvicultural options for black ash communities facing the threat of emerald ash borer

Anthony W. D'Amato

Department of Forest Resources, University of Minnesota, 115 Green Hall, 1530 Cleveland Avenue North, St. Paul, MN 55108

Black ash represents a keystone species within many lowland forest communities in the upper Great Lakes region. Correspondingly, the impacts of emerald ash borer (EAB) on the functioning of these forests may be quite dramatic, including changes in hydrology and vegetative state. Although there are no known silvicultural methods for preventing or eradicating EAB from black ash forests, there may be opportunities to build in resilience to this introduced pest through proactive treatments designed to increase the abundance of species other than black ash within these systems. In effect, the main objective of these treatments is to maintain these sites as forested wetlands in the event that a large proportion of black ash is killed by EAB.

Given the often mono-specific nature of black ash forests, most replacement species will need to be introduced to these stands using artificial means, including direct seeding and the planting of containerized seedlings. Potential replacement species for these sites based on the historical abundance of tree species in these habitats include northern white cedar (*Thuja occidentalis*), yellow birch (*Betula alleghaniensis*), tamarack (*Larix laricina*), quaking aspen (*Populus tremuloides*), black spruce (*Picea mariana*) and red maple (*Acer rubrum*). The varied seedbed conditions within these lowland communities will require seed and seedling placement to be opportunistic and focused on favorable microsites, such as hummocks, versus rigid spacing. In addition, high water conditions in the spring may necessitate the use of fall plantings within these stands. In most cases, the abundance of woody and herbaceous competition within these systems will necessitate the application of release treatments to ensure the successful establishment other tree species.

Because of the strong control mature black ash trees exert on hydrology, it will be critical to retain a large proportion of mature trees on these sites to maintain high levels of transpiration during reproduction cuttings. One approach would be the use of nurse-tree shelterwood methods in which overstory black ash are used as a nurse crop to maintain favorable hydrologic conditions while replacement species become established in the understory. Similarly, the use of group and patch selection systems could also be employed, depending on the tolerance of replacement species being favored. Given the cost-intensive nature of some of the treatments required to establish other species on these sites, it will be economically and logistically infeasible to treat all black ash stands. Therefore, stands receiving these resilience-based treatments should be prioritized based on ecological or cultural value. Moreover, given the limited amount of knowledge that currently exists regarding the management of alternate species

in these stands, it will critical to take an adaptive approach and to encourage knowledge transfer regarding successful silvicultural strategies within and across agencies.